



The historical change of transport system and traveling time in Tsukuba City, Japan.

- How the transport system has changed in my town?-



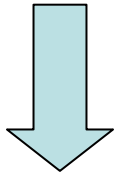
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【 Introduction 】

Rapidly development in my town
The rural suburb surrounding
the kanto plain



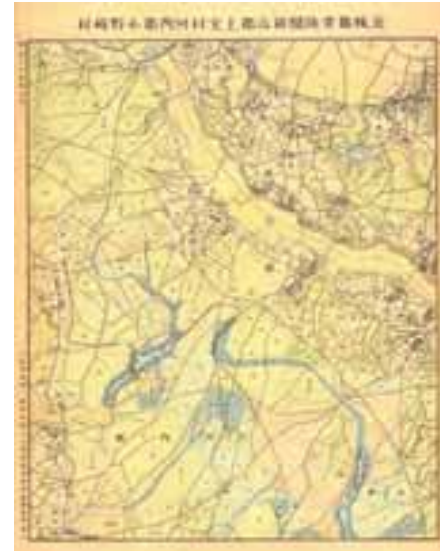
The birth of new big city in 1987

The attraction of national institute,
NASDA, Tsukuba University and
large business enterprises

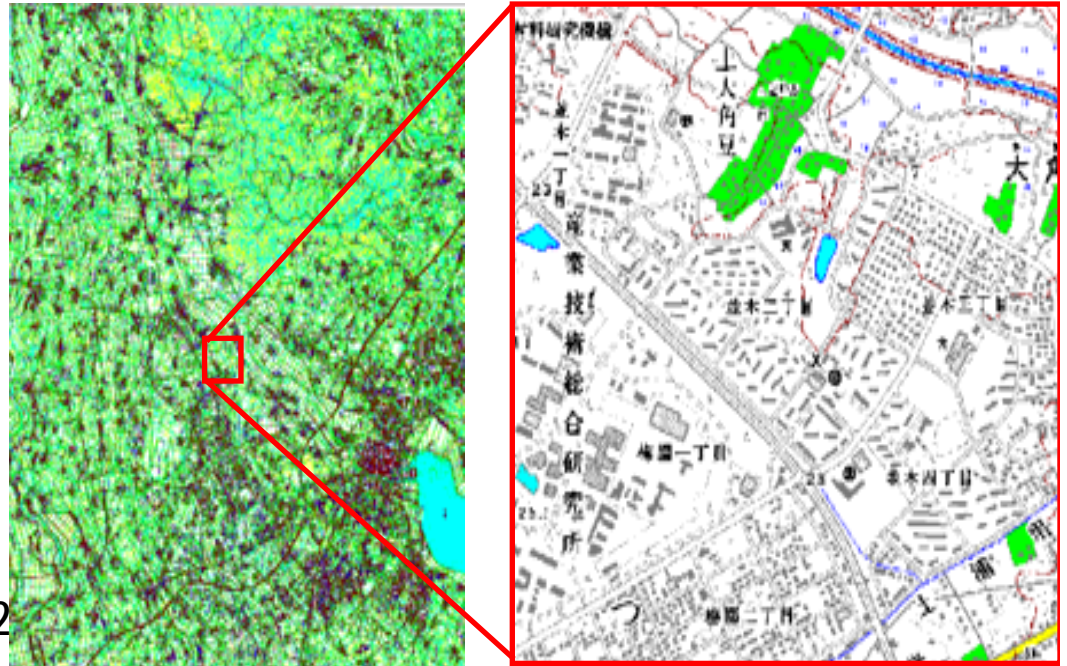
The dynamic change of
transport system

Digital GIS map in 2002

How change our accessibility to Tokyo !!



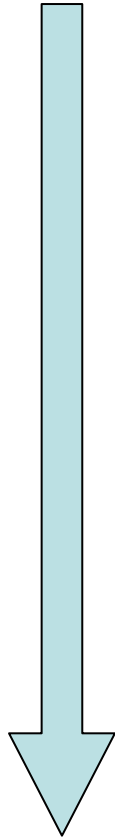
Paper map drawn in 1883.



【 Objects 】

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We evaluate the transport convenience by calculating the traveling time from our town to Tokyo Station



The change detection of the traveling time to each data points in selected five age from 18 67 to 2006

Map drawing of traveling time distribution and it's change to each age.

The discussion to the change of transport convenience and
it's regional characteristics

【 Study area 】

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The location of Tsukuba City



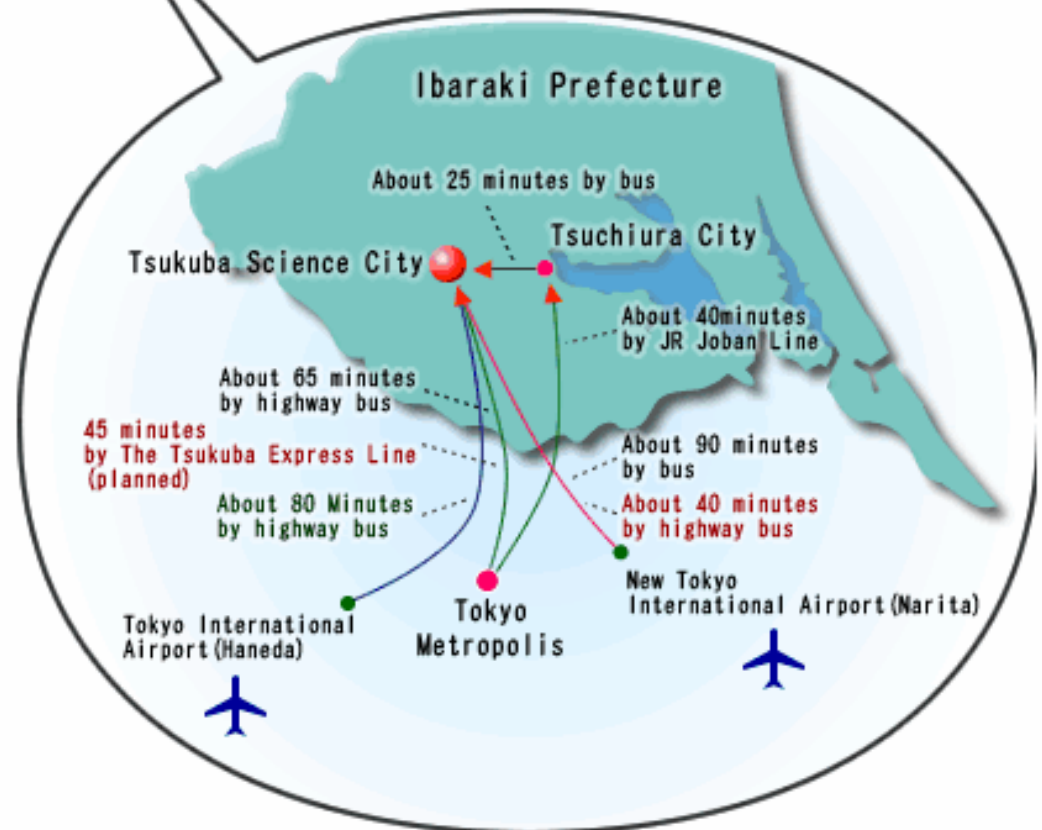
Established in 1987

about 50 km northeast of Tokyo

Population: about 200 thousand

Areas: 284.07km²

Characteristic:



The change of the transport system from Tsukuba to Tokyo

~ 1867

The establishment of a new government
of Japan

1896

Japan National Railway was open from Ueno
station to our prefecture.

1987

The birth of Tsukuba City
Highway Bus system was started

2005

Just before Tsukuba Express Railroad (TX)
was open.

A new station (Hitachinouchiku) was open near
Tsukuba City in 1998

2006

Tsukuba Express Railroad (TX) was started



【 Methods

1. Setting the target years

Age	Year	Transport
I	1867	Foot traffic
II	1896	Japan National Railway was open
III	1987	Tsukuba City and highway bus was started
IV	2005	New station of Japan Railway and highway bus
V	2006	TX was opened

2. The conditions to calculate the traveling time

- 1) Arrive at Tokyo Station from Tsukuba City at 12:00 A.M. on Sunday
- 2) Method to move: walking, bicycle, local bus, highway bus and railroad
- 3) Speed to walk: 4km/h, bicycle: 12km/h

3. Time data points

Current student houses of Namiki High School, bus stops, primary schools, junior high schools, post offices and institutes

4. The calculation of traveling time in each data points

Age1= Traveling time by walk

(Distance from each points to Tokyo / walking

speed)
Age2 to V = Minimum time from each points to Tokyo
using applicable transport system.

5. The drawing of traveling time map and calculation of difference in time for each historical change.



【Data and Software】

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Base GIS data and map image

Digital national land information and Digital maps 25000
produced by Geographical Survey Institute

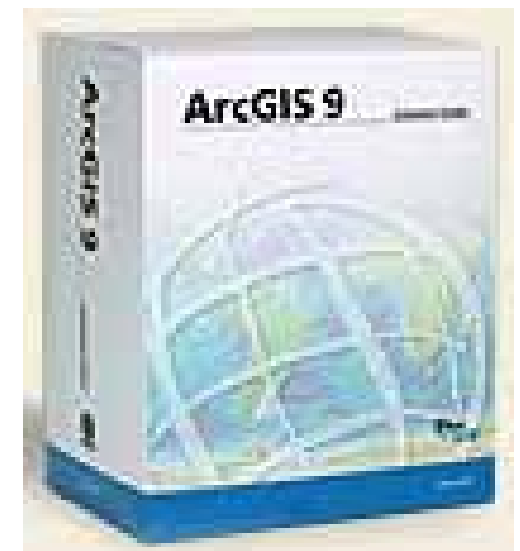
Time data points

The student house and main establishments =
The address matching to detect the Lat/Lon and import to ArcGIS

The local bus stops and high way bus stations =
The manual data arrangement

GIS Software

ArcGIS 9.0
donated by ESRI Japan as the educational program



【 Result 1 】

The traveling time in
Agel(1867)



“Nihonbasi in Edo”
Wood printing
made by Horoshige Ando
(1833)

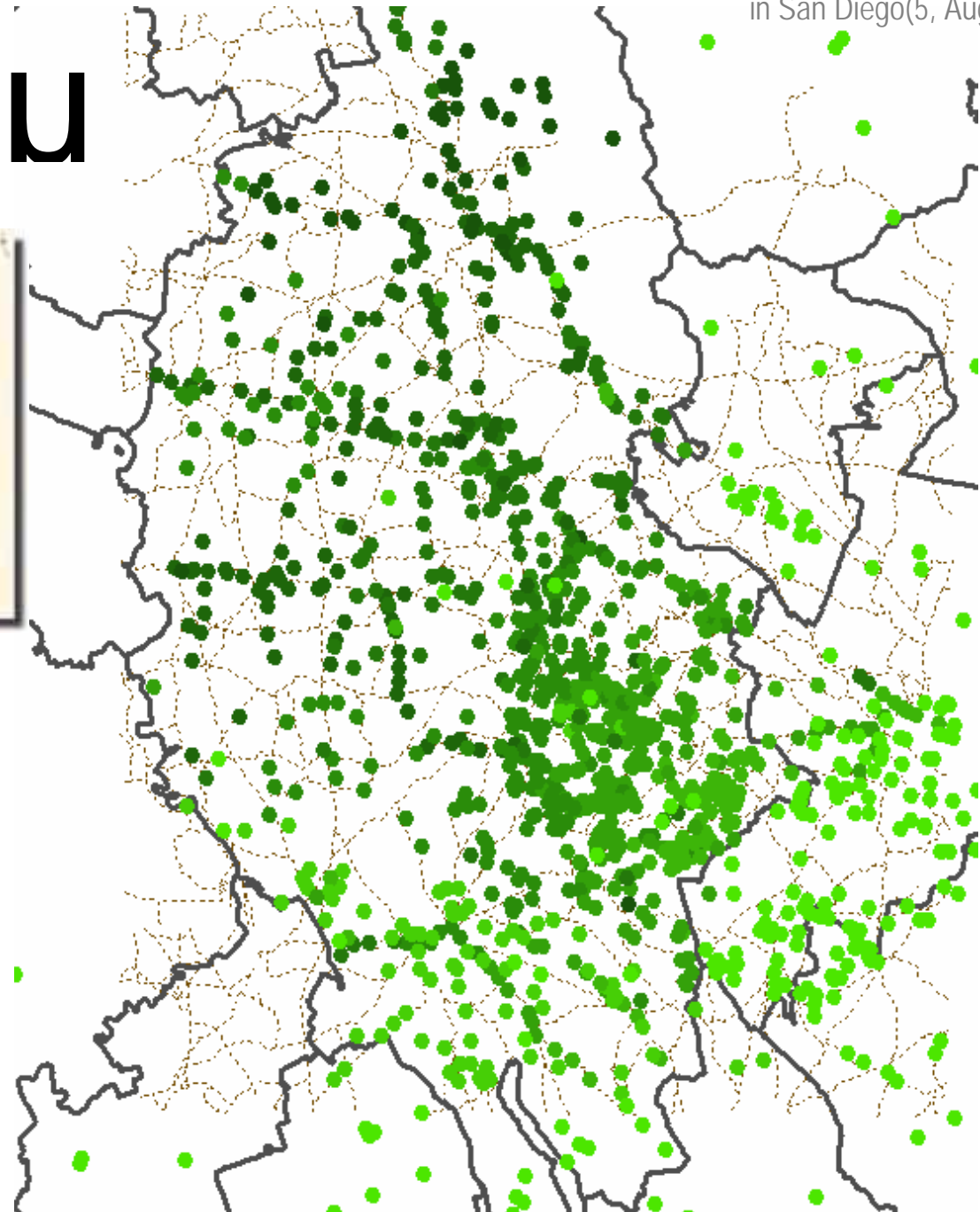
0 1 2 4 6 8 10



900 1000 1100 1200



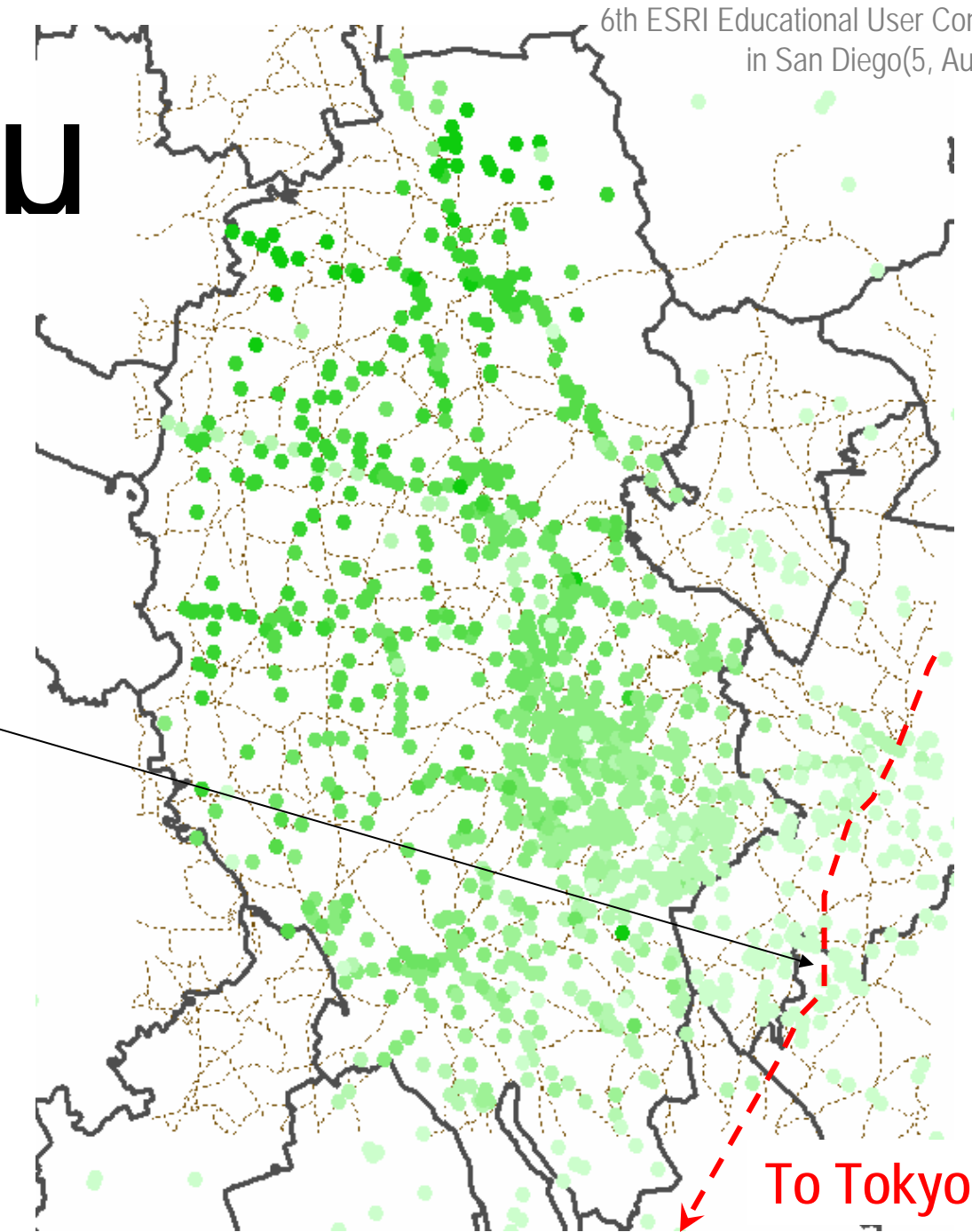
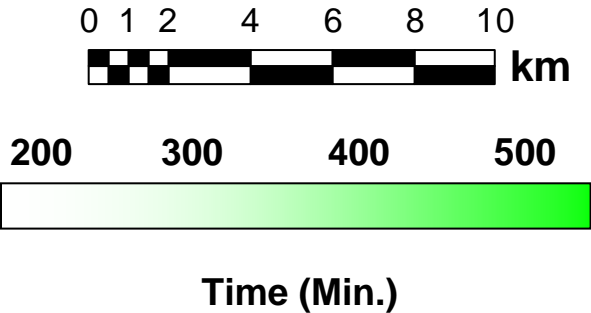
Time (Min.)



Agell(1899)



Japan
National Railway



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AgeV(2006)



Tsukuba
central station

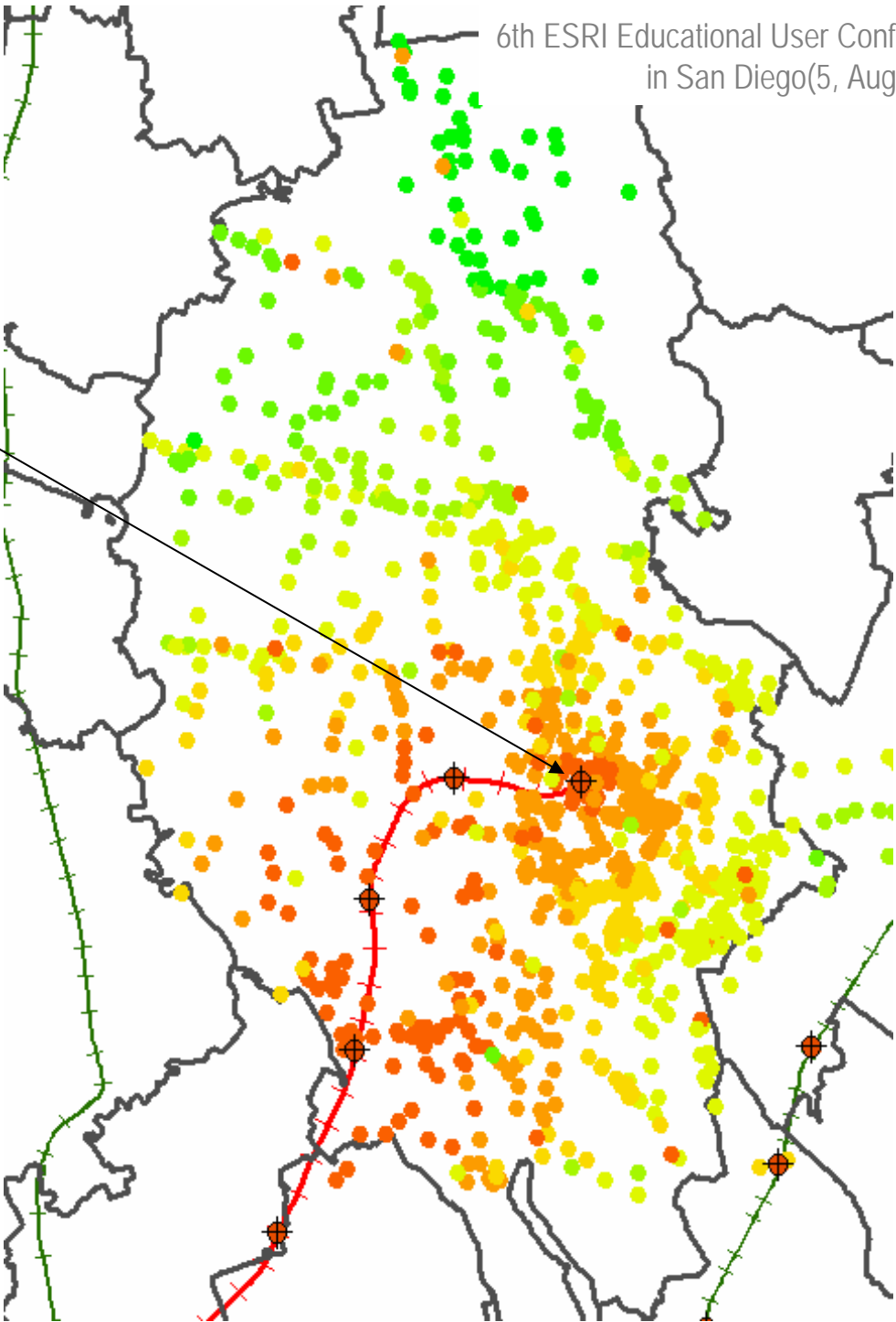


Tsukuba Express



Time (Min.)

U



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【 Result 2 】

A difference of
traveling time

AgeI(1867)

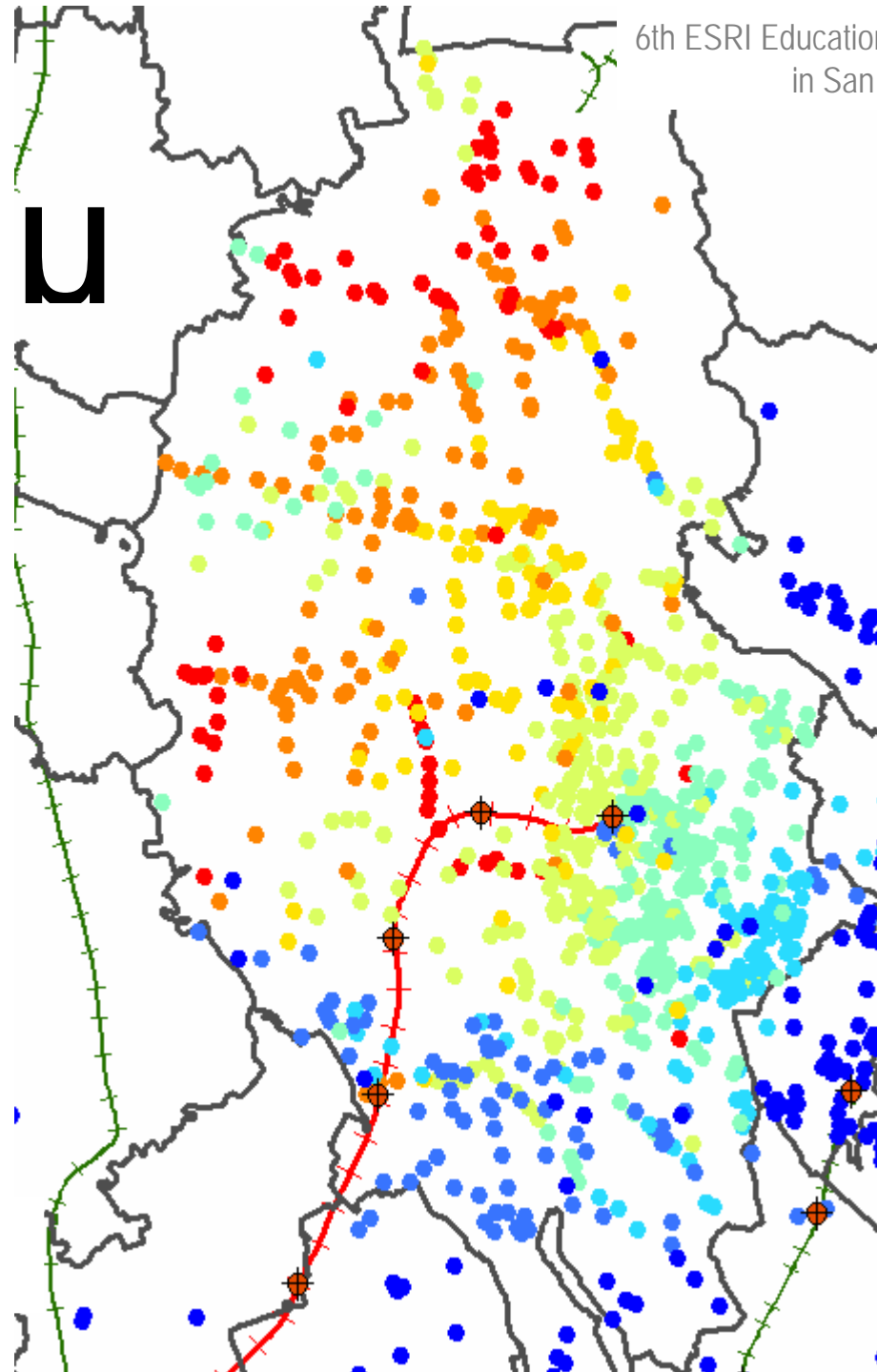
-V(2006)

0 1 2 4 6 8 10

km

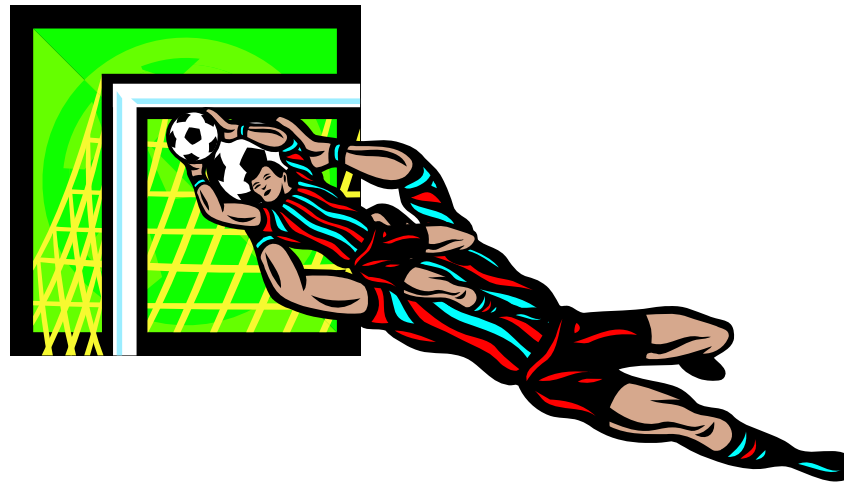
800 900 1000 1200

Time (Min.)



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Thank you for attention !!



Please contact to
T. Saito or S. Kameyama about details of study